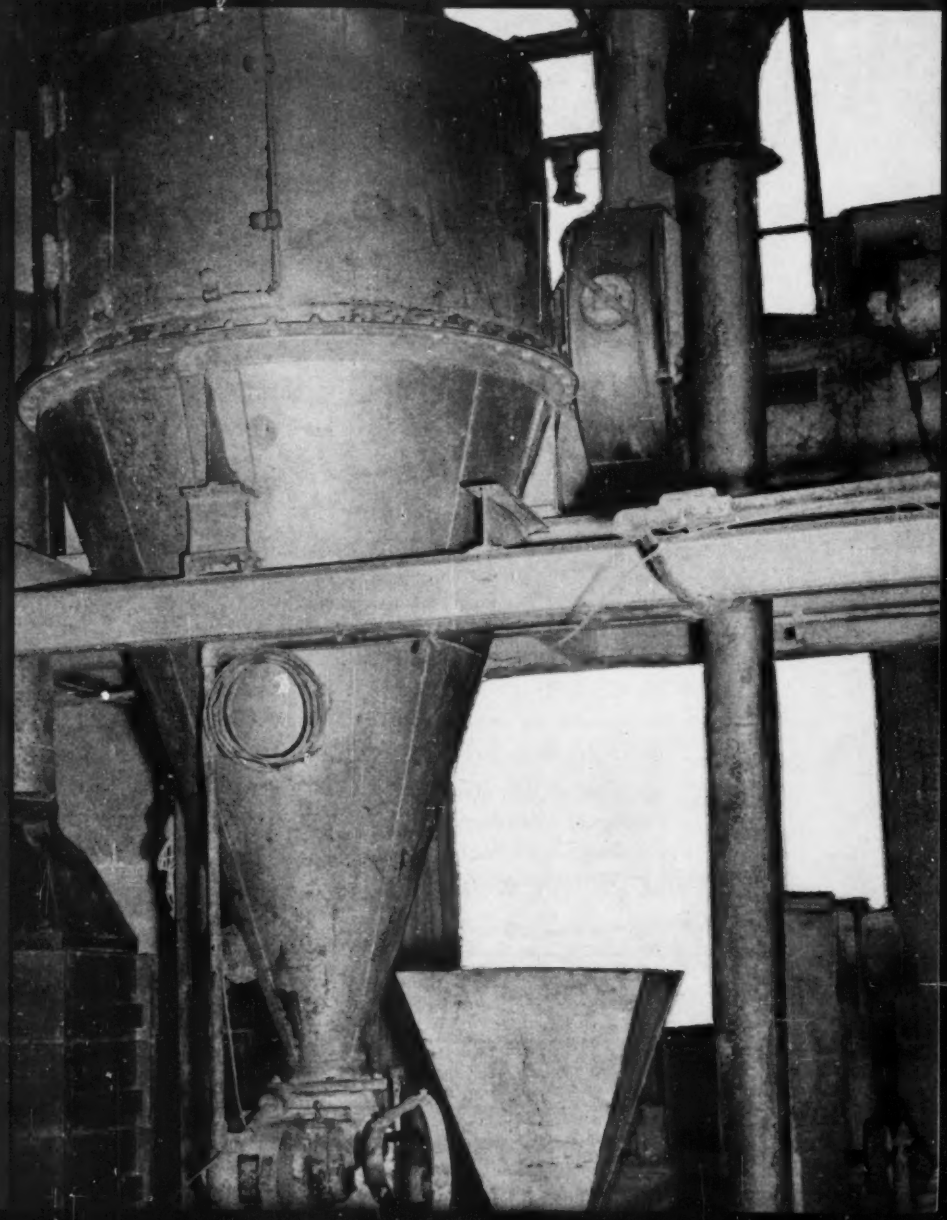
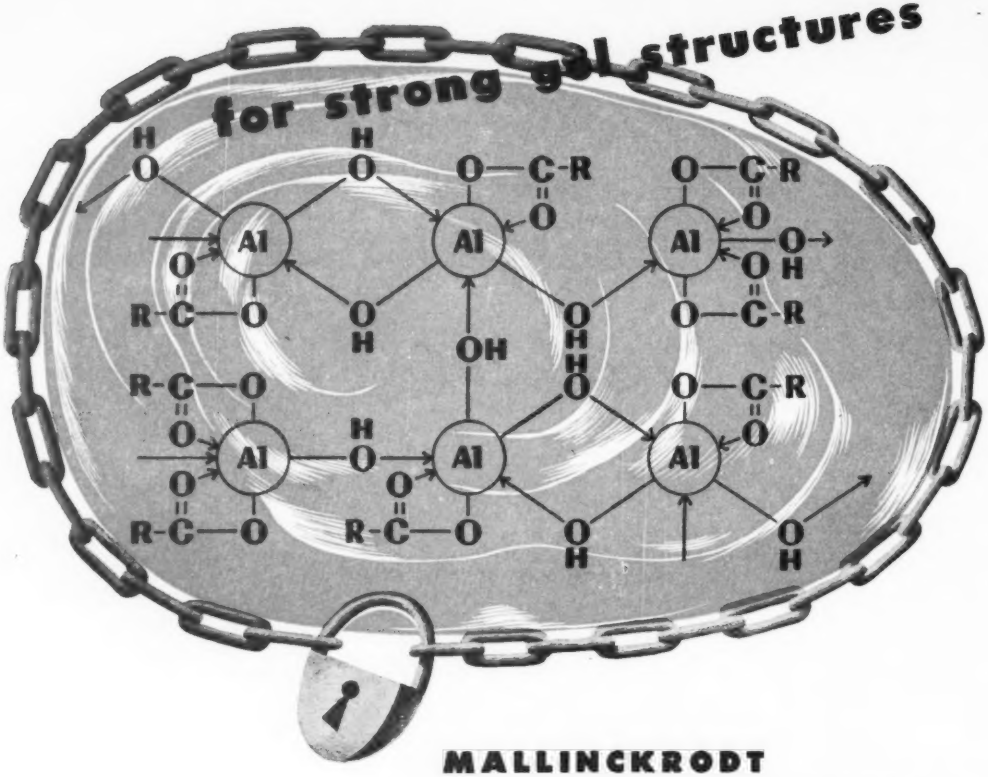
The Spokesman

JUNE • 1952



OFFICIAL PUBLICATION

NATIONAL LUBRICATING GREASE INST. NLGI



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*Dean, W. K., "The Structure of Aluminum Greases", *Inst. Spokesman*, XV No. 6, Sept., 1951, p. 12.

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Silicone Notes

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Midland, Michigan

DOW CORNING 44 SILICONE GREASE

In electric motors which may operate hot, the mechanical fit-up of the bearing assembly has a critical effect on the life expectancy of silicone grease. This was proved by life-testing various greases in the bearings of totally enclosed non-ventilated induction motors operating at high temperatures. The relation between shaft-fit and life in hours is shown in Figure 1.

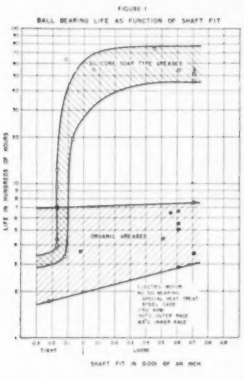
FIGURE 1
BALL BEARING LIFE AS FUNCTION OF SHAFT FIT
SILICONE SOAP TYPE GREASES
ORGANIC GREASES
LIFE IN HUNDREDS OF HOURS
SHAFT FIT IN 000 OF AN INCH

In the TENV induction motors used to test bearing life at 150°C., these curves indicate that the life of Dow Corning 44 lubricated bearings with a shaft-fit of 0.2 mils loose is about 15 times the life of identical bearings with a shaft-fit of 0.2 mils tight.

These data show the importance of mechanical fit-up. A tight shaft-fit, for example, may take up most of the radial clearance in the bearing. Where the inner race operates at a higher temperature than the outer race, unequal thermal expansion may put the balls under compression. Any combination of mechanical fits which produces radial clearances inadequate at operating temperatures, or poor bearing alignment, will subject the grease to extreme pressures and result in unsatisfactory bearing life.

The subject of Design Considerations for Optimum Performance of Silicone Greases in Ball Bearings is more fully developed in a paper recently read before the ASLE. Write for a copy.

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With a solidification point below —40°F. and no true melting point, Dow Corning Valve Seal A is unique among valve lubricants for its stability at both high and low temperatures and for its resistance to oxidation. It is generally inert chemically and physiologically; shows excellent resistance to hot water and to a wide variety of chemicals and gases.

The usefulness of Dow Corning Valve Seal A in chemical services too severe for conventional lubricants is indicated by tables recently published in a new data sheet describing its performance in valves handling more than 120 different chemicals and gases. Here's a representative sample taken from actual field service experience:

Reagent	Temperature, °F.	Rating
Brine (caustic)	Hot	Good
Calcium chloride (molten), 100%	327	Good
Sodium hydroxide, 60%	300	Fair
Sulfuric acid, 98%	77	Good
Lubricating oils	----	Good
Chlorinated phenols	Hot	Good
Slurry of aluminum chloride, benzoyl chloride and paraphenyl phenol	347	Good
Slurry of potassium dichromate, sodium chloride and sodium sulphate	265	Good
Acetylene	----	Good
Ammonia (liquid)	----	Good
Hydrocarbon gas	—120 to 500	Good

There are, of course, too many variables to permit specific recommendations. The tables from which these examples were taken do serve, however, to establish the fact that Dow Corning Valve Seal A is used successfully in many services where the life and reliability of valves is severely limited by failure of conventional lubricants.

For example: In the valves of large turbines, an electrical manufacturer recommends the use of Valve Seal A under pressures as high as 400 psi and temperatures ranging up to 750°F.

***WRITE TODAY** for more information on Dow Corning Valve Seal A. Please address Department N-18b and ask for data sheet No. VSA-1.*

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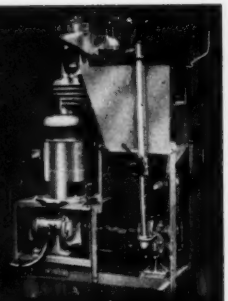

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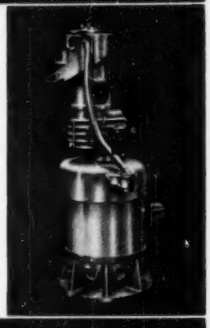

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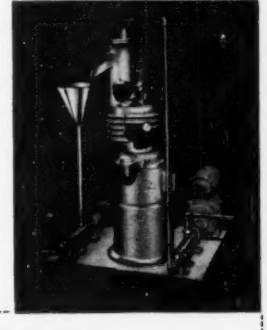

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See page 29 for correction of "Maintenance Lubrication of Ball and Roller Bearings," by R. L. Wheeler, which appeared in last month's issue.

ABOUT THE COVER

In the production of aluminum stearate grease bases, uniformity is of extreme importance and may be attained by long and continuous runs, especially in the drying stage. This month's cover picture shows the cyclone separator of one of Metasap's continuous driers installed at the company's Cedartown, Georgia, plant.

Large quantities, running into many tons of the raw materials required for the particular grease base to be produced, are first laboratory tested to make certain that they come within Metasap's rigid specifications. Wherever necessary, the raw materials are adjusted to conform to the specification.

The wet product is fed into the drier for final processing. During its passage through the drier, every metallic soap particle is subjected to the same degree of controlled temperature. The metallic soap is not handled or, in fact, even seen again, until it passes through all stages of drying and grinding.

The grinders are equipped with screens which hold back coarse particles while air is used to convey the finely ground stearate to the cyclone. At the cyclone the stearate is accumulated and transferred to packaging equipment where it is prepared for shipment.

As the stearate is being packaged, samples are taken of every 1000 pounds and sent to the control laboratory as a final check to assure conformance with Metasap's standards for uniformity.

President's page

by George E. Merkle, President, N.L.G.I.

HELPING STALIN

There are comparatively few American citizens who would admit being Communists or willing to help Stalin. One can hardly be both a Communist and an American citizen, yet a large number of our citizens act like Stalin's subjects and may not realize it.

Anything that will hinder our production of war supplies or harm our economy or adversely affect our morale is of great assistance to Stalin. To effectively wage a war and quickly win it requires brains, supplies and the maximum of cooperation. These requirements apply equally in any endeavor. These are well known facts.

We have a good supply of raw materials; we have the brains; but where is the cooperation? This is the link that weakens an otherwise strong chain.

The tops in brains is often made available to our war effort at very low cost. This is an example of real sacrifice and patriotism and the kind of service Stalin does not like.

The raw materials are supplied by nature and for many items nature has been good to us. Science has contributed greatly in finding substitutes for some necessary items in short supply.

With brains and materials one might think that our problem was solved. Unfortunately, the processing of goods, transportation of them and the many other services required to make and deliver the necessary finished products require the assistance of those on the home front. This latter item seems like little enough to expect of those not required to face bullets and possibly never return to their homes or suffer permanent injuries.

The facts are, however, that large numbers are willing to harm the war effort by hindering necessary production which might save lives while they seek great returns for themselves. It is done boastfully by some claiming disaster as a result of their actions.

Many of such actions appear to be aimed at creating inflation which we recognize as most undesirable. To ignore laws and regulations, whether they are perfect or not, certainly weakens morale and this is by no means a small item in the accomplishing of any feat. I believe it was Napoleon who said that morale is 40 per cent of an army. This seems like a low value for morale but is probably a high figure compared with our present status. If cooperation were used as much as it is abused, I believe our morale would be greatly improved, and efforts to destroy our economy would be reduced, resulting in a big boost to our war effort and a good blow to Stalin.

Fretting

T. G. ROEHNER
and
E. L. ARMSTRONG

Socony-Vacuum Laboratories
Brooklyn, New York

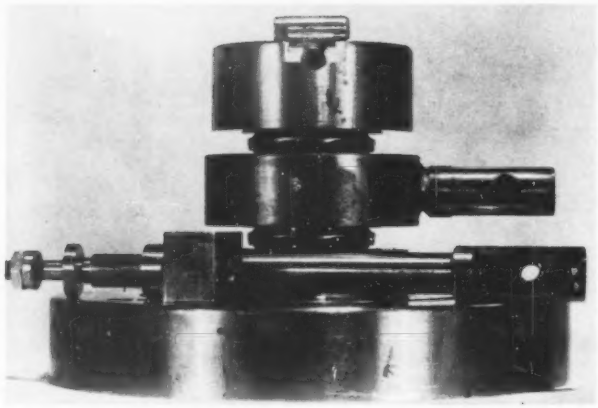


FIGURE 1, close-up showing position of test bearings.

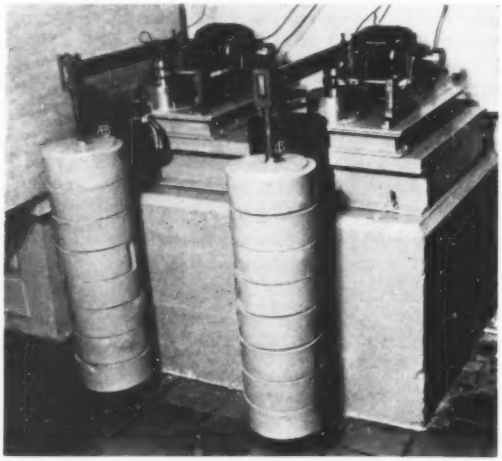


FIGURE 2, close-up of tester with load lever removed.

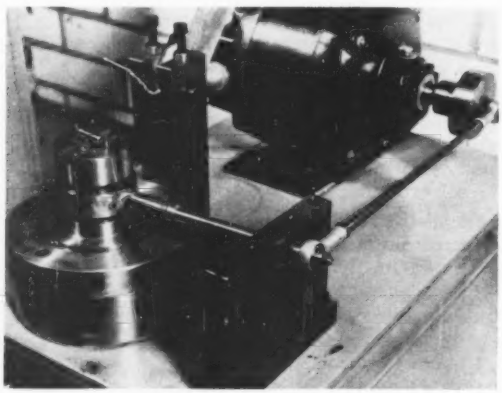


FIGURE 3, close-up of tester.

THE prevention of fretting corrosion continues to be a tantalizing problem for lubrication engineers. Fretting corrosion is recognized when encountered in antifriction bearings in actual service by the presence of two tell-tales, vibratory motion as a cause and iron oxides as an effect. It is not always practical to change the design of the machine and/or the operating conditions sufficiently to practically eliminate vibratory motion; and lubrication engineers are often expected to correct the situation by changing the lubricant. If conditions are severe a different lubricant is not an adequate answer. However, there are cases where a properly directed change has been found to be effective.

It is not the objective of this article to submit a detailed explanation for the occurrence of fretting corrosion. In these tests it is sufficient to repeat reports to the effect that fretting corrosion or, as some investigators state, friction oxidation is the removal of very finely divided metal from bearing surfaces due to inherent adhesive forces which are assisted by vibratory motion. It may occur in antifriction bearings in a wide range of applications such as airframe control installations, propeller plate stack bearings (1), automotive wheel bearings, line shafting and high speed textile machinery bearings. Fretting corrosion of platinum, glass, quartz, ruby and mica surfaces as well as of steel surfaces, have been reported (2).

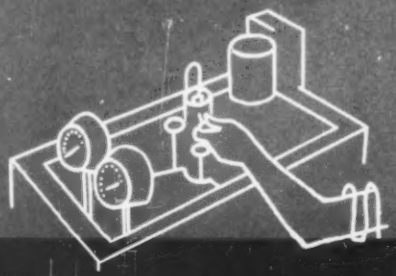
Various types of testers have been employed for evaluating lubricating greases in respect to their ability to minimize or prevent fretting corrosion. Many of these testers have been modifications of Fafnir Bearing Company's Friction Oxidation Machine (3). The data reported hereinafter were obtained with one of those modifications as shown in Figures 1, 2 and 3. The differences in design between the original Fafnir Tester and the modified machine are shown in Table I. Both testers use Fafnir FS 14831 thrust bearings.

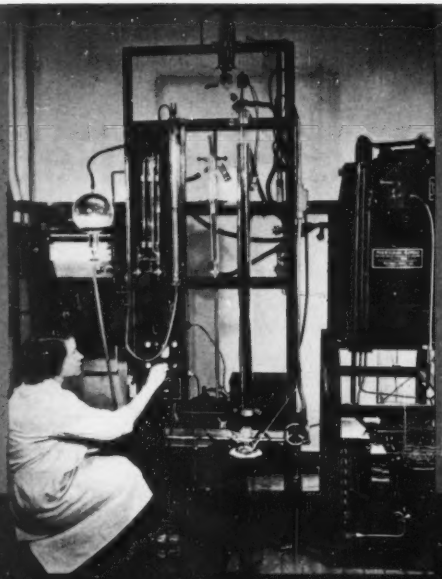
Corrosion Studies With a Modified Fafnir Machine

TABLE I

Comparison of Original and Modified Fafnir Testers

Original Fafnir Design	Modified Fafnir Design
1—Central bearing post used to align bearings and to adjust load spring.	Central bearing stack post removed to eliminate fretting corrosion occurring between the stack and post. Lever arm deadweight loading applied through hardened cross pins separated by a thin hardened plate. Uneven loading from spring avoided. Pins rest in hardened grooves in lever arm and bearing stack cap.
2—(a) Plane of oscillating arm below plane of motor drive spindle axis.	Plane of oscillating arm and plane of motor drive spindle axis are coincident and so avoid uneven strain on the test bearing stack.
(b) Rigid oscillating arm.	Oscillating arm pivoted at bearing stack end permitting vertical motion, i.e., alignment, slide guide provided at driven end of oscillating arm eliminating vertical whip.
(c) No guide at driven end of oscillating arm; result, rod whips vertically.	
(d) Connecting rod fitted with rod end ball bearings.	Connecting rod fitted with rod end ball bearings.
(e) Fixed eccentric.	Variable eccentric.
(f) 1725 RPM, ¼ HP Electric Drive Motor.	1725 RPM, ¼ HP Electric Drive Motor.
3—No automatic motor-stop control operated by bearing failure temperature rise.	Thermocouple in bearing load cap in contact with top bearing top race actuates a sensitrol relay which in turn actuates a power relay which stops the drive motor upon incipient bearing failure temperature rise.





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The procedure of test using the modified tester is the following. Two Fafnir FS 14831 thrust bearings previously cleaned, dried, weighed and packed with 1.5 grams of the test lubricant are assembled in the tester. The eccentric is adjusted to the desired arc of oscillation and connected with the connecting rod to the outboard end of the oscillating arm. The load pins are slushed and smeared with test lubricant to reduce fretting and placed in position. The load arm is lowered onto the top pin, the load pan is attached and the desired number of load weights applied thereon. The control thermocouple is placed in the bearing cap and the sensitrol relay circuits, which had been previously set to stop the drive motor at 150° F., are checked. This temperature was chosen experimentally as representing a degree of bearing wear in the poor range (according to the Fafnir rating scale of 0.020 to 0.100 grams loss for a 50-hour test). The time required to reach this state of wear may be used in comparing poor greases. After the predetermined operating period has been completed, the equipment is stopped by the operator, the load removed and the bearings removed, cleaned, dried and weighed.

A broad analysis of the mechanisms of fretting corrosion indicates that there are two types of factors involved—mechanical and lubrication. Under the heading of mechanical, arc of oscillation, frequency of oscillation and applied load were studied. The lubricating grease variables investigated were primarily consistency and additives.

The mechanical conditions imposed by machine design and operation are normally fixed as far as the lubrication engineer is concerned. Their importance is demonstrated by a series of tests as shown in Tables II, III and Figure 4 which follow. The lubricant which was used in these tests, designated Grease A, had characteristics as shown below.

CHARACTERISTICS—LUBRICATING GREASE A

ASTM Penetration @ 77° F.:	
Unworked	320
Worked 60X	325
Soap Content	10%
Type Soap	Lithium*
Mineral Oil Viscosity	
S.U.V. @ 100° F.	750"
Dropping Point	350° F.

*Contains minor amounts of modifying soaps.

It will be noted that as the arc of oscillation increased from 3° to 18°, the bearing weight loss increased decidedly. When the load was increased from 275 lbs. to 1100 lbs., the weight loss on the test bearings increased from 1,4 milligrams to 19.0 milligrams in 50 hours. An increase in frequency of oscillation led to greater bearing wear and an increase of the load at any particular frequency likewise resulted in more wear. In other words, this series of tests showed that these particular mechanical factors must be controlled before satisfactory reproducibility or repeatability of test equipment can be obtained. Furthermore, it is evident that any variation between these test conditions and those encountered in the field may also affect the performance ratings of the lubricants.

TABLE II

EFFECT OF OSCILLATION ARC AND APPLIED LOAD

Lubricant — Grease A
Osc./Min. — 1725 Cycles
Duration of Tests — 50 Hours

Load, Lbs.	Oscillation Arc 3°	6°	12°	18°
	Bearing Weight Loss in Milligrams			
275	0.0	....	....	1.4
550	0.8	....	1.0	9
1100	1.4	8.5	14	19

TABLE III

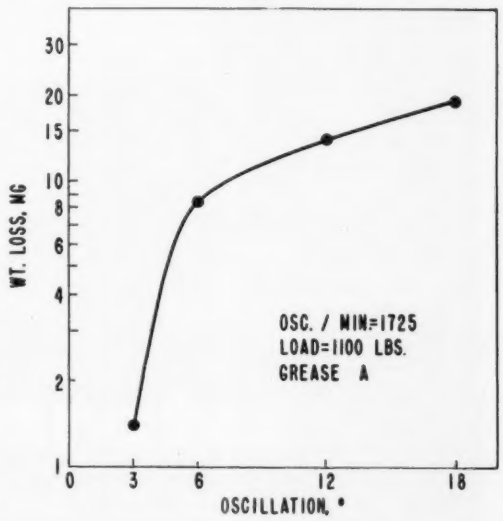
EFFECT OF OSCILLATION FREQUENCY

Lubricant — Grease A
Test Time — 50 Hours

Load, Lbs.	Cycles/Minute 863	1725	3450
	Bearing Weight Loss in Milligrams		
550	0.1	1.0	*
1100	0.8	9.0	*

*Too severe for test machine construction.

FIGURE 4



In another series of tests, the mechanical conditions were fixed and the characteristics of the lubricating grease were varied. In view of the fact that the bearings have an oscillating motion, it is to be expected that greases with stiff penetrations may not track as satisfactorily as soft or semi-fluid products. This effect is illustrated by Figure 5 using a range of consistencies of Grease A. It will be noted that the performance of the grease was poor at a penetration number of 275 and that excessive wear in this case occurred at a penetration number of 225. Further confirmation of this may be seen from Table IV on comparing Runs 1, 2 and 3. Even though EP additives were incorporated in the grease used in Run No. 3, it showed a high weight loss because its penetration was 235. On the other hand, when the mineral oil component only of Grease A was used as in Run 5, an improvement over Grease A was noted (compare Runs 5 and 6 under same test conditions). It was necessary, when using the mineral oil alone, to relubricate the bearings at 25-hour intervals.

TABLE IV

LUBRICATING GREASES WITH ADDITIVES

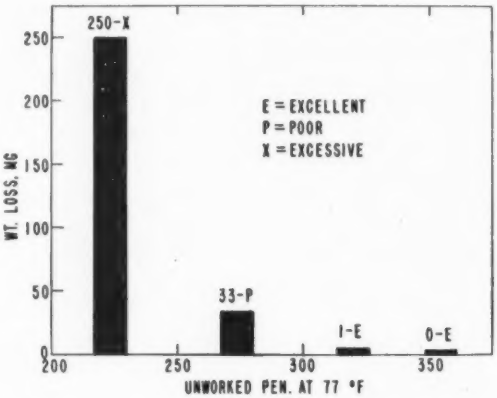
Arc — 12°
Oscillation — 1725 Cycles/Min.

Run No.	Product	Worked Pen. 60X	Test Hours	Load Lbs.	Weight Loss, Mgs.
1	No. 1 Lime Base Cup Grease	330	50	550	1
2	No. 1 Lime Base Cup Grease + EP	312	50	550	0
3	No. 3 Lime Base Cup Grease + EP	235	50	550	62
4	Grease A (Lithium)	325	50	550	1
5	*750°/100° F. Naphthenic Oil	—	75	1100	2
6	Grease A	325	75	1100	16
7	Grease A + 5% Sulfur Chlorine Additive	333	75	1100	1
8	Stiff Grease A + 5% Sulfur Chlorine Additive	254	75	1100	132
9	**Grease A + 10% Graphite	355	6	1100	38
10	**Grease A + 5% Graphite	337	15	1100	66
11	Grease A + 10% Molybdenum Disulfide	315	75	1100	517

*Bearings relubricated with test oil at 25 and 50 hours.
**Graphite = AN-G-24a Grade (MIL-G-6711).

In Runs 6 through 11 examples are given of the effect of fillers and additives as a means for improving the fretting corrosion preventive properties of lubricating greases. Comparing Runs 6, 7 and 8, it will be evident that the incorporation of an EP gear oil type additive containing sulfur and chlorine was beneficial provided the consistency of the finished grease was not too stiff. Runs 9 and 10 when rated against Run 6 showed that graphite in 5% and 10% concentrations is harmful. Likewise, the dispersion of 10% molybdenum disulfide, as in Run 11, increased the rate of wear of the bearings.

FIGURE 5



In order to determine the effect of the debris of fretting corrosion on the chemical stability of new grease, such as might occur through contamination during relubrication of a bearing, a sample of new Grease A was contaminated with the used Grease A removed from several test runs in which fretting corrosion had been severe. Actually, the new grease was mixed with the fretting corrosion debris in the ratio of 7 parts of new grease to 1 part of used grease and the mixture was tested in the ASTM Bomb Oxidation Test. The results are shown in Figure 6.

It will be noted that Grease A showed no break point in the Oxidation Curve for a period exceeding 200 hours, whereas Grease A, plus fretting corrosion contamination, showed a sharp drop in pressure after about 175 hours. It might be pointed out that in service the percentage of fretting corrosion contamination would probably be higher than that used in conducting this test.

The modification of the Fafnir Friction Oxidation Tester used for the test runs outlined above has oscillating thrust test bearings. There is some question, therefore, as to what extent the information obtained therewith may be applied to radial bearings subjected to a vibratory motion. Furthermore, it is realized that regardless of type of bearing, the relationship of load, frequency, amplitude of vibration and particularly the direction of application of the forces against the stressed surfaces is not duplicated in a tester operated under a few specific sets of mechanical conditions as described above. However, the following conclusions derived

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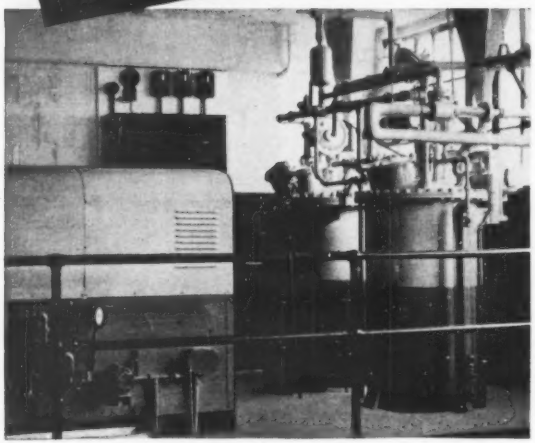

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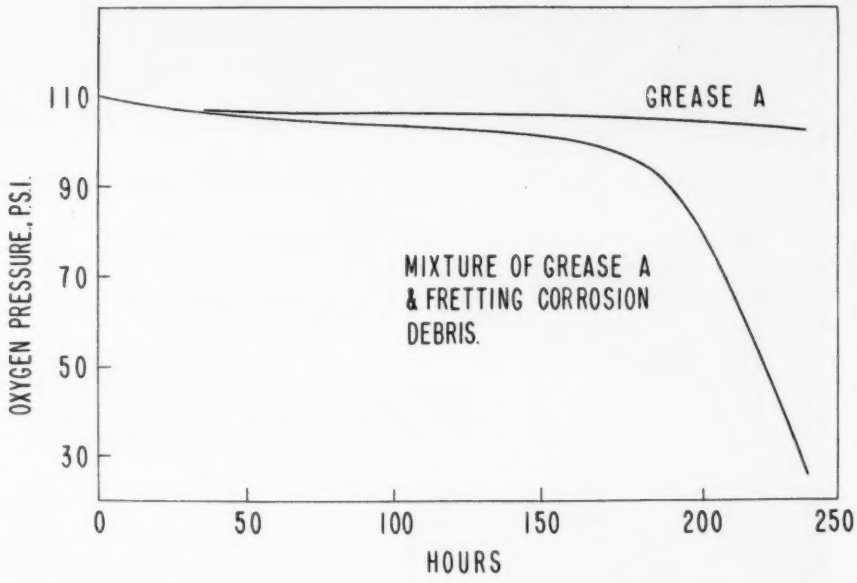
FIGURE 6



from these tests have been found in actual experience in the field to have significant directive value.

1. The tendency toward fretting corrosion is promoted by increasing the arc and frequency of oscillation of the bearings.
2. Before differences in quality of lubricating greases can be realized they must have the proper consistency to "track" properly, i.e., to permit renewal of lubricating film.

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(2) Douglas Godfrey, *Investigation of Fretting Corrosion by Microscopic Observation*. Feb. 1950 NACA TM 2039.

(3) Hudson T. Morton and F. G. Patterson, *Friction Oxidation*, Institute Spokesman, August 1948, Vol. XII, No. 5.

about the authors

T. G. Roehner

T. G. Roehner received his Bachelor of Chemistry degree from Cornell University in 1924. He spent six years in Chile, South America, with the Braden Copper Company, as Test Engineer and Chemist. In 1930 he joined the Standard Oil Company of New York, and his present position with Socony-Vacuum Oil Co., Inc., is that of Director of the Technical Service Department of Socony-Vacuum Laboratories, Brooklyn, New York.

E. L. Armstrong

Eldon L. Armstrong was born in 1918, in Hazleton, Indiana. He received a B. S. in Chemical Engineering from Purdue University in 1940 and an M. S. in Chemical Engineering from Polytechnic Institute of Brooklyn in 1948. After graduation from Purdue, he joined Socony-Vacuum Oil Co., Inc., at its East St. Louis Refinery and in 1941 was transferred to the Technical Service Laboratories in Brooklyn. He is presently engaged as supervisor of research and development work on lubricating greases. Mr. Armstrong is a member of the American Institute of Chemical Engineers, American Chemical Society and Sigma Xi.

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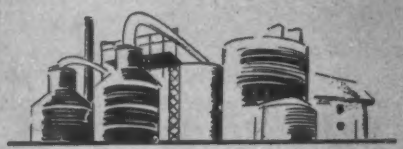

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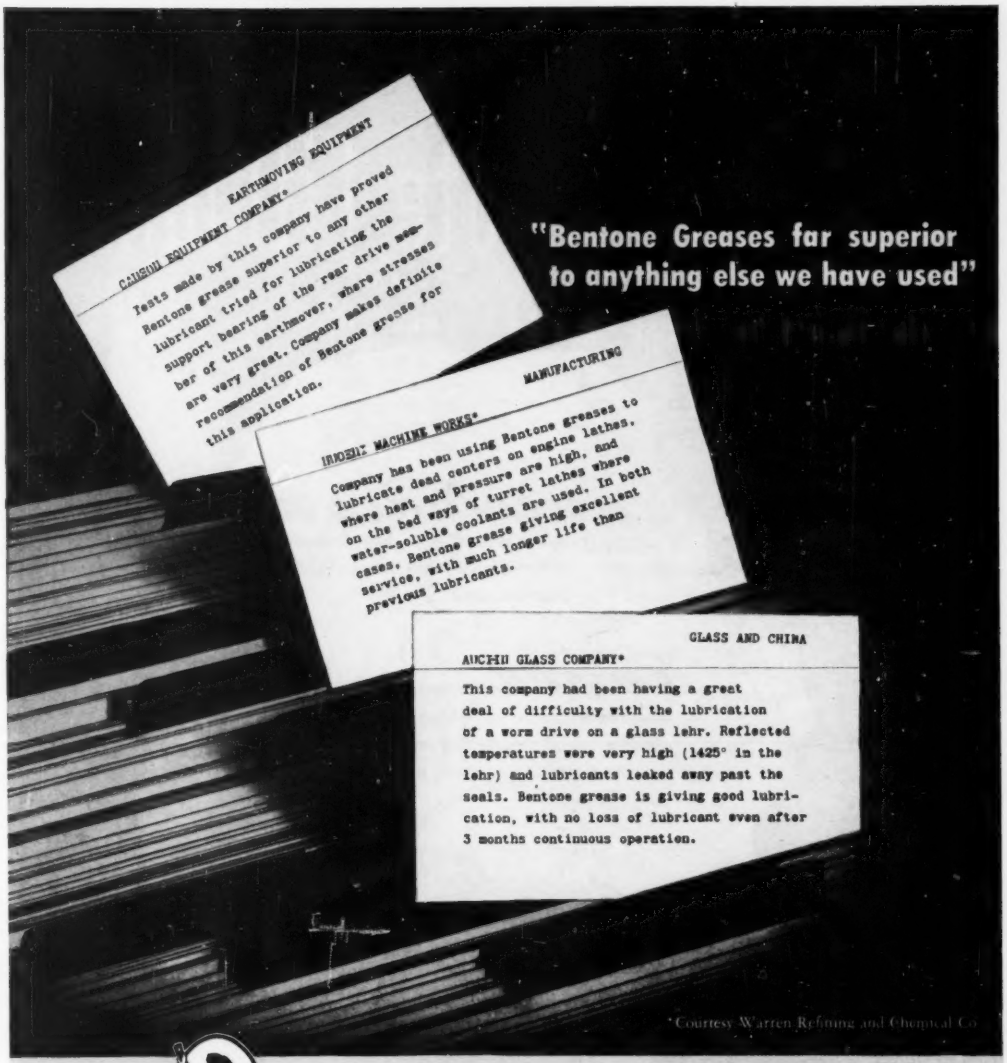
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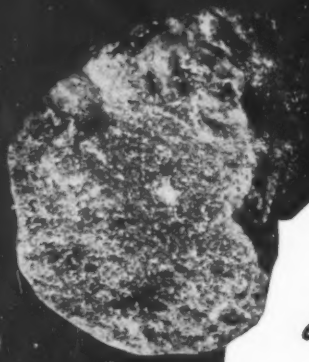

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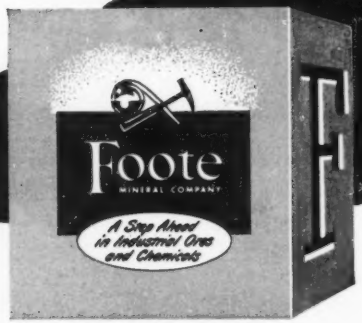

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The Technical Committee

Chairman T. G. Roehner, Director of the Technical Service Department, Socony-Vacuum Laboratories

Under date of April 21 forms were sent to each member of the NLGI Technical Committee listing the current Subcommittees and Cooperative Committees. The members were requested to record the projects in which they are interested and on which they would be willing to serve. Space was also provided for statements concerning new projects which should be considered by the Technical Committee. The replies to this questionnaire have been very encouraging, particularly in respect to offers to serve on the subcommittees which will be organized to work on the three new projects originated at the last Annual Meeting. It is certainly noteworthy that within one week after distribution of the forms, replies were received from:

Prof. Walter J. Ewbank
Cato Oil and Grease Company

Mr. Warren A. Brown
Deep Rock Oil Corporation

Mr. H. C. Meyer, Jr.
Foote Mineral Company

Mr. Robert F. Pomeroy
General Lubricants Company

Mr. H. M. Fraser
International Lubricant Corp.

Mr. R. K. Smith
Kendall Refining Company

Mr. Peter A. Asseff
The Lubrizol Corporation

Mr. E. M. Higgins
Master Lubricants Company

Mr. J. B. Stucker
The Pure Oil Company

Mr. R. S. Pearson
Rieke Metal Products Corporation

Mr. H. C. Zweifel
Richfield Oil Corporation

Mr. N. J. Gothard
Sinclair Refining Company

Mr. M. L. Carter
Southwest Grease & Oil Co., Inc.

Dr. C. L. Fleming
Standard Oil Development Company

Mr. Carl E. Hartwig
Swan-Finch Oil Corporation

We hope that this record will be maintained and that all replies will arrive within the next few weeks so that they can be compiled and action taken to complete organization of all the Subcommittees.

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Patents and Developments

Synthetic Oil Greases

A lubricating grease effective over a wide temperature range is described in a patent issued to Union Carbide & Carbon Corporation (U. S. 2,585,182). It was found that certain dihexoate and dioctoate esters of certain polyglycols, in particular the di-2-ethyl-butyrates and di-2-ethylhexoates of triethylene and tetraethylene glycols, are effective lubricant bases for compounding grease compositions. They have low volatility, excellent low temperature viscosity characteristics, and they can be gelled with suitable thickeners to provide stable greases. For example, a metal soap grease can be made from these polyglycol esters which is capable of satisfactory lubrication at temperatures varying as low as 95° F. to at least as high as 250° F.

Ricinoleates, stearates, hydroxystearates and naphthenates of alkali and alkaline earth metals provide satisfactory gelling action and greases thickened with 5% to 25% of lithium hydroxystearate have given particularly desirable lubricant results. A minor amount (2% to 5%) of an antioxidant such as phenyl alpha naphthylamine, dianisidine, or polymerized trimethyl dihydroquinoline, also may be added.

Grease of Improved Working Stability

It has been known in the art that, in order to produce an alkali metal soap grease of excellent structural stability and freedom from syneresis, the grease should contain at least 10% of soaps of high and low molecular weight fatty acids. However, U. S. patent 2,586,693 issued to Standard Oil Development Co., discloses that such qualities may be obtained with much less amount of soap by combining the alkali metal soaps of high and low fatty acids with a soap of an aryl-aliphatic acid. Of the alkali metals, lithium and sodium are preferred.

The high molecular weight fatty acid may be any one of the saturated or unsaturated fatty acids employed in conventional greases, such as hydroxystearic acid, hydrogenated fish oil acids, beef fat acids, tallow acids, etc. The low molecular weight acid, the second component, may be formic, propionic, acrylic, butyric, or lactic acid or acrylonitrile, while the third component must be an acid with an aliphatic chain of at least eight carbon atoms in length and there must be dependent from that chain an aryl group which may or may not contain substituent groups. An example is xylyl stearic acid.

An example of a grease prepared according to this patent is as follows:

	Per Cent by Weight
Acrylonitrile	0.65
Acetic acid	0.50
Xylyl-stearic acid	0.50
Hydrogenated fish oil acid	4.50
Lithium hydroxide monohydrate	1.40
Conventionally refined Coastal distillate having a viscosity at 210° F. of 55 S. U. S.	91.95
Phenyl alpha naphthylamine (oxidation inhibitor)	0.50

Inspection tests on this grease composition were as follows:

Dropping point, F., 375
Unworked penetration, 260 mm./10
Worked penetration (100,000 strokes 325-1/16" hole worker plate, 347 mm./10
Per cent free alkalinity, 0.08 as NaOH

The effect of the amounts of components on the properties of such greases is given in Table I:

TABLE I

PROPERTIES OF GREASE STRUCTURES CONTAINING ARYL-ALIPHATIC ACID

	Parts by weight of Acid			Properties	Penetration mm./10	
	Fish Oil Acid	Acetic Acid	Xylyl-Stearic Acid		Unworked	Worked
a	10	3.5	10.0	Heavy, elastic consistency	105	Too hard to work.
b	5	1.75	5.0	do	198	210 (aerated)
c	2.5	0.875	2.5	do	245	255 (aerated)
d	0.5	0.175	0.5	Good stable grease structure. Soft consistency, only slightly cohesive.	285	368

Film Strength Grease Additives

Improvement in film strength of greases has been found readily accomplished by addition of an additive produced by reacting phosphorus pentasulfide with an organic fatty acid of 12 to 18 carbon atoms.

According to U. S. patent 2,587,642 issued to Standard Oil Company (Ohio), the reaction is carried out at above 150° C., sufficient to break up thiophosphoric compounds, obtaining a product having a high sulfur content in which the sulfur replaces oxygen of the fatty acid. A temperature of 250° to 450° F. is used with a reaction time of one-half hour to one hour. A minimum of 20% to 35% of P_2S_5 is sufficient, based on the fatty acid. A diluent may be employed.

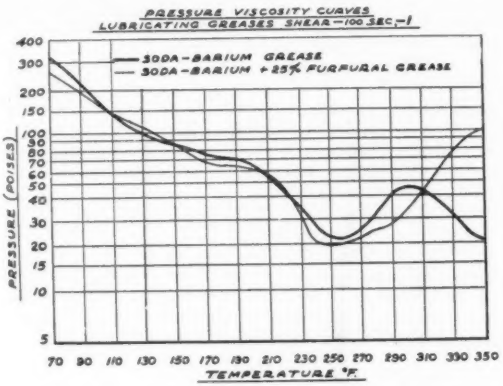
All Purpose Lubricating Grease

A blended sodium and barium grease is described in U. S. patent 2,588,279 issued to Standard Oil Development Co., which is claimed to be particularly superior to similar greases in a number of respects.

In the patented grease, the first component is a soda-barium grease made by a process of cold blending. The second component is a grease containing the sodium soap of a high molecular weight saturated fatty acid and the sodium salt of a low molecular weight organic acid. The two components are made separately and then blended together at room temperature in a homogenizer or grease mill.

The mol ratio of sodium soap to the barium soap operable in the finished grease varies from 1:1 to 25:1, with the preferred ratio being 18:1. As to the second component, a grease with sodium soap (such as sodium soap of hydrogenated fish oil acid) and sodium salt (such as sodium furoate) in the ratio, preferably, of 1:1 is used. It is desirable to blend 90% to 65% of component 1 with 10% to 35% of component 2.

The accompanying graph represents the pressure viscosity curves of a usual soda-barium grease compared with a soda-



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barium grease with 25% of a furfural grease (made by reacting 10% furfural into furoic acid soap by the Cannizzaro reaction described in one of our previous articles). At temperatures below 300° F. the blended grease has a structure of essentially the same plasticity as the sodium-barium grease while showing improved properties of shear, stability, oxidation resistance, etc. The sharp continued increase of the viscosity of the blended grease at temperatures in excess of 300° F. shows the incompatibility of the low molecular weight salt with the paraffinic mineral oil and depicts the undesirable thickening effect of the mixture, explaining why such greases cannot be made by conventional methods.

Table II shows a number of industrial grease blends of the patented composition compared with conventional soda-calcium soap greases. The blended greases, although having considerably lower soap contents, show higher dropping points, better oil separation characteristics and better high temperature (BEC) performance properties. Especially notable are the shear stability characteristics, the blend of greases breaking down only 20 to 30 penetration points during 10,000 strokes with the fine hole worker.

Block Grease

The addition of a small amount of surface active material is claimed to be effective in greatly reducing losses normally incident to manufacture of block greases due to rejections of portions of the batch.

As is well known, block greases have sufficiently high penetration values making them suitable for use on high temperature bearings in rotary kilns, calendar rolls, etc. Good block greases are characterized by the presence of small pockets of oil in the grease and freedom from inclusion of pockets of air or other gas. Conventional block greases have a tendency to "bread loaf" in the cooling pans, acquiring a hard upper crust due to cooling, which crust rises and cracks, in a manner reminiscent of old-fashioned bread. Such grease portions are unsuitable and rejects as high as 60% of the batch may be incurred from such difficulties.

In its U. S. patent 2,588,326, Socony-Vacuum Oil Co., reports that additives such as glycerol and dimethyl-silicone polymer are not very effective in reducing this undesirable characteristic. However, addition of less than 1% of an oxygen-containing surface-active organic compound is effective. Examples are di-isobutyl adipate, di-2-ethyl hexyl sebacate, mono-2-ethyl hexyl adipate, etc. It is added to the charge to the kettle at the time of adding the mineral oil. Yields of 60% to 75% of acceptable block grease are reported.

News Items

Tailor-made petroleum sulfonates of high molecular weight and uniform composition and useful as additives in lubricants were announced by Morton-Withers Chemical Co., Greensboro, North Carolina. They have a molecular weight of 575 to 600 and a 475 molecular weight product will be available (Chem. Wk. 3/1/52 p. 1033). Production will be at the rate of 1¼ million lb./mo. (J. Comm. 3/5/52 p. 11).

Influence of lubricant viscosity at operating temperatures of 75 mm. bore cylindrical-roller bearing at high speeds—Macks et al (NACA Tech. Note 2/52 No. 2636).

Chemicals used in lubricating oils and greases — Kuhn (Chem. & Engrg. News 3/10/52 p. 979).

Baker Castor Oil Co., is advertising production of barium, cadmium, calcium, magnesium and zinc ricinoleates (Chem. Wk. 3/15/52 p. 7).

Phthalocyanine lubricating greases — Fitzsimmons et al (Ind. & Engrg. Chem. 3/52 p. 556).

Melting points and solubilities of ternary mixtures containing oleic acid—Schlenker (J. Amer. Oil Chem. Soc. 3/52 p. 94).

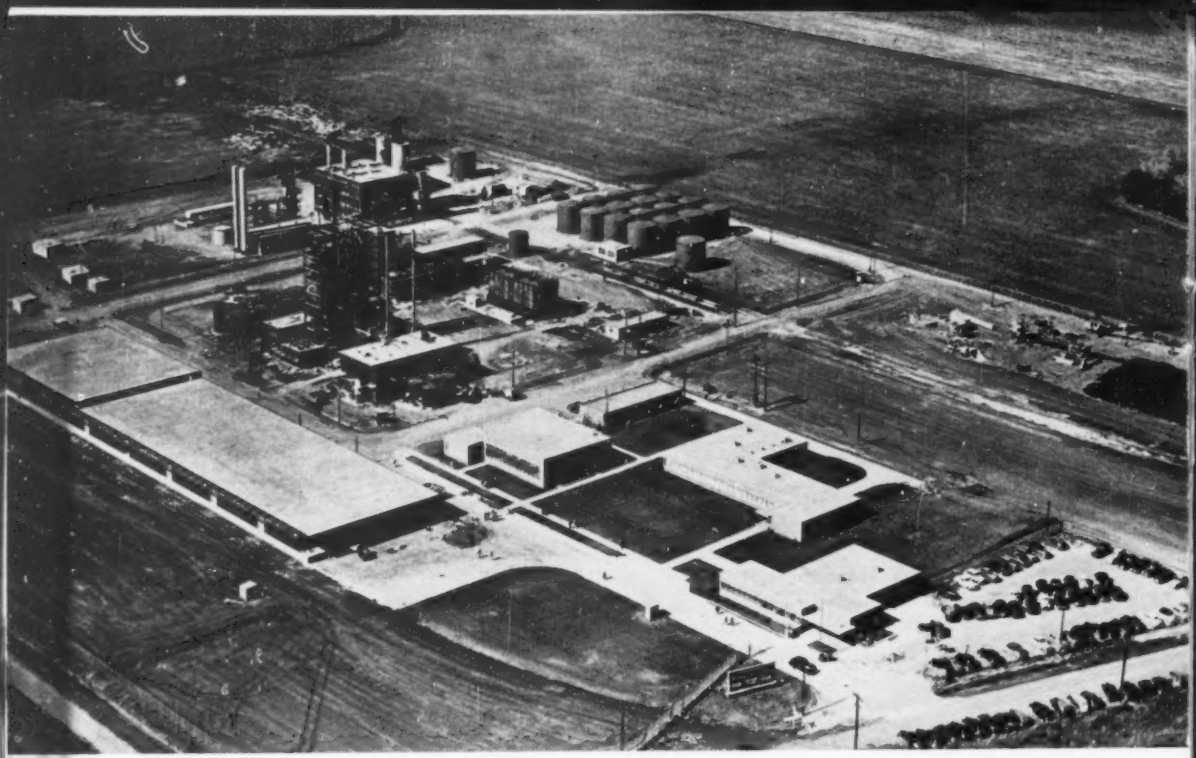
TABLE II

INDUSTRIAL GREASE BLENDS

75% Sodium/Barium Grease + 25% Sodium-Furoate Grease

Soap Content Na/Ba Base	Total Soap Content, Per cent	Worked Penetration, mm./10 Fine Hole Plate 1,000[1]	5,000[1]	10,000[1]	10,000[2]	Drop Point °F.	Oil Separation Per cent 50/210° F.	Wheel Bearing Test[3]	Per cent Loss BEC Test @200° F.
6	10.3	323	342	344	349	423	10.0	Pass	23
8	11.8	294	317	318	322	417	5.3	do	13
10	13.3	282	284	300	301	406	3.6	do	10
Conventional Na/Ca Greases:									
21% Na/Ca Soap		326	375	.....	.....	350	5.6	Fail	73
13.5% Na/Ca Soap		420+	.....	.....	.....	345	21.7	do	....

[1]Penetration taken immediately after working.
[2]Grease cooled 90 minutes, worked 60 strokes and repenetrated.
[3]According to AXS-1574 Ford Wheel Bearing Test Procedure.



GENERAL MILLS' CHEMOIL PLANT at Kankakee, Illinois, 60 miles south and west of Chicago, now turns out fatty acids and allied products for American industry. Sprawling over 32 acres, it represents six years of teamwork by the company's management, its Chemical and Engineering Divisions and its Research Laboratories.

NEW MEMBER

General Mills Joins NLGI

ANALYTICAL CHEMISTS guard efficiency of the Chemoil plant's operations as well as the quality of its products. In this modern laboratory, they examine raw materials to guide processing, check samples from every stage of production and analyze final products to make certain they meet rigid specifications. Adjoining the control laboratory is a pilot plant where engineers continuously seek improvements to basic processes.

"YOU can influence research environmentally, but you cannot lead it. You must follow where research leads." This philosophy, coupled with the force of circumstance, has brought the world's largest flour miller into the National Lubricating Grease Institute.

The philosophy comes from James F. Bell, founder of General Mills, Inc. And it has long guided the company's moves into diversified and sometimes startling operations.

One of these operations is the processing of soybeans and the production of fatty acids and fatty acid derivatives from animal and vegetable oils. Conducted by General Mills' Chemical Division, it has boosted the company into a prominent position in the fats and oils industry. Since fatty acids play a key role in many petroleum lubricants, it has also made General Mills a "partner" in the manufacture of lubricating greases.

Strangely, yet logically, General Mills' Chemical Division grew from the company's main business, milling. In the milling process, many by-products—red dog, shorts, bran and others—are produced. These materials are valuable animal feeds. But they do not provide nutritionally balanced rations for livestock; they need to be supplemented with feeds rich in other nutrients, including protein.

A key source of protein, of course, is soybean oil meal. And General Mills used large amounts of the product in its scientifically-developed formula feeds. At times, however, soybean oil meal was in short supply.

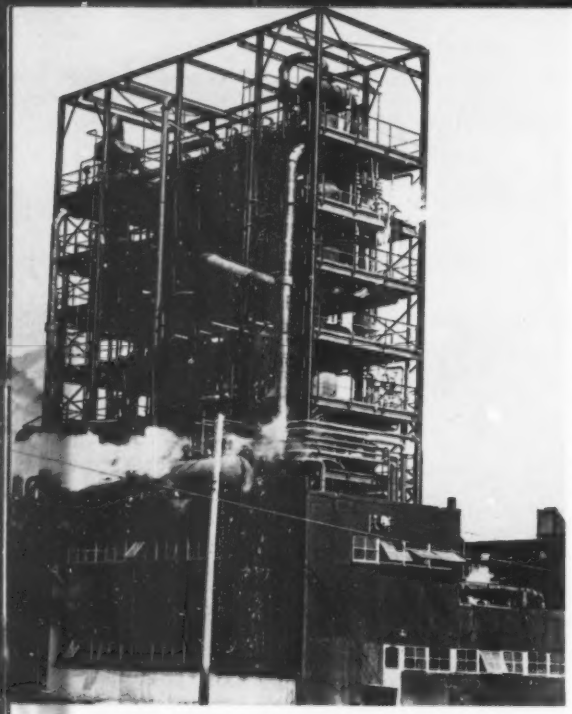
The logical way to whip the problem, General Mills reasoned, was to process its own soybeans. And that meant turning out soybean oil as well as meal.

Soybean oil, however, had a large and growing market; it was moving into protective coatings, fabrics, putty and caulking compounds and into edible products. Under the stress of World War II, it found an even more rapidly accelerating demand. In 1943, therefore, General Mills formed its Chemical Division and opened a soybean processing plant and refinery at Belmond, Iowa.

Since soybean oil is a source of fatty acids, the Division's next step was logical: establishment of a plant to turn out a line of fatty acids from a variety of vegetable and animal oils. General Mills made that move in 1948, when it opened its modern fatty acid plant at Kankakee, Illinois.

At this point, Mr. Bell's philosophy began to show its full effect. General Mills' Research Laboratories, which had played a key role in planning the soybean oil and fatty acid plants, launched an intensive search for new fatty acid derivatives. They lead the company into

THIS MAZE OF PIPES and columns produces hydrogen, 99.9% pure, for use in processing hydrogenated fatty acids sold to the lubricating grease, rubber and other industries. Propane (from petroleum) reacts with steam at a temperature of about 1500 degrees Fahrenheit over a nickel catalyst to yield carbon monoxide and hydrogen. Later, the carbon monoxide reacts with oxygen, producing carbon dioxide which is removed by a stream of monoethanolamine. Pure carbon dioxide can be regenerated and sold as a valuable by-product.



MIXED FATTY ACIDS, split from glycerine with which they are combined in natural oils, are separated from each other in these fractionating columns. Each column is actually a series of boilers that distills off the MORE volatile acids, removing them from the LESS volatile fraction. Individual, purified "fractionated" fatty acids go into paints, varnishes, enamels, printing inks, soaps, cosmetics, pharmaceuticals, foods and a legion of other products.

production of Polyamide Resins, heat-sealing adhesives and paper coatings. They began to work out new drying oils and resins. They improved processing techniques to create fatty acid products of unequalled quality. Today, they are beginning pilot production of amines, amides and nitriles, derivatives of fatty acids used in the refinement of mineral ores, in detergents, germ-killing agents, waxes, molding compounds and water-repellent coatings.

Meanwhile, the Chemical Division, at its Kankakee plant, continues to turn out a complete line of saturated and unsaturated fatty acids with the trade name, Aliphats. Today, these products serve in protective coatings, soaps, insecticides, rubber and buffing compounds, waxes, polishes, cosmetics, pharmaceuticals and, of course, *lubricants.*

At the same time, the Division continues to expand. Recently, it completed a new soybean processing plant and refinery at Rossford, Ohio—forming another link in the chain reaction that started with wheat.

Santolube puts HD into premium lubricants

SANTOLUBE

Monsanto Santolube 382 and Santolube 388 will help give your lubricants the kind of performance demanded by modern passenger automobiles. These heavy-duty, detergent-inhibitor-type additives help keep engines clean to give better performance with reduced wear. For information write MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

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MONSANTO CHEMICALS — PLASTICS

Serving Industry . . . Which Serves Mankind

Petroleum Dictionary and Products Manual Offered By Petroleum Educational Institute

G. A. ZAMBONI, (right) managing director of the Petroleum Educational Institute, Los Angeles, points out to Advertising Counselor Edward L. Koblitz, of The Edwards Agency, how the 2113 illustrations in the Institute's newly published "Petroleum Dictionary and Products Manual" simplifies the understanding of petroleum terms.

A "Petroleum Dictionary and Products Manual", which will prove a valuable aid to buyers, sellers, consumers and salesmen of petroleum products, particularly those who do not possess a technical background, has just been published by the Petroleum Educational Institute of Los Angeles, California. This 502-page book contains 6164 entries and 2113 illustrations and is not only a dictionary but also gives information on the fundamentals and application of petroleum products as well.

Much of the factual information about the use and application of petroleum products, secured by the Institute during 16 years research in connection with its home study courses in fuels and lubricants, is included in this book.

The "Petroleum Dictionary and Products Manual" gives a simple, understandable definition of the many technical and semi-technical terms generally found in periodicals, books and other literature in connection with the application and use of petroleum products and much of the equipment utilizing these products and what these tests mean to sellers, buyers and users of petroleum products.

Included are definitions of hundreds of lubricating and other oils, more than a score of different gasolines, information about the additives generally used in present day fuels and lubricants and defines greases, terms connected with the origin, history, drilling and production of crude oil and also describes diesel and spark engines. By so doing the book becomes more than a dictionary, it becomes virtually a practical education in the vital subject of products information.

This work is so complete that it can become a valuable products information manual on the most common petroleum products used in the automotive, agricultural, textile, mining, lumbering, steel, railroading, ceramic, refrigeration, paper, food and many other industries. The "Petroleum Dictionary and Products Manual" sells for $8.00 with a positive money-back guarantee. For a copy of this book or for additional information, write Petroleum Educational Institute, Dept. E., 9020 Melrose Ave., Los Angeles 46, California.

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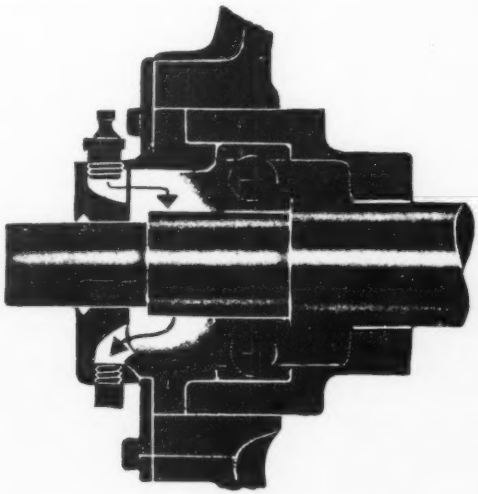
MAINTENANCE LUBRICATION

OF BALL AND ROLLER BEARINGS

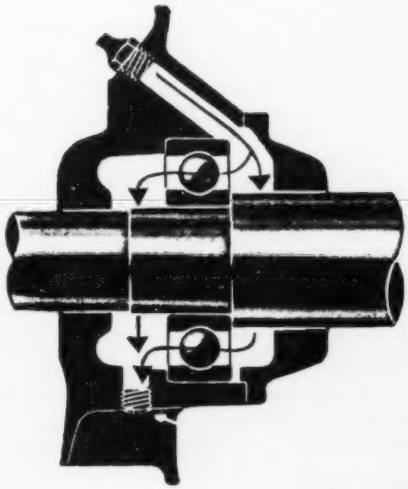
R. L. WHEELER
Chief Fuels and Lubricants Engineer
General Machinery Division
Gulf Oil Corporation
Pittsburgh, Pennsylvania

FIGURE 8



PRESSURE FITTING WITH RELIEF PLUG
(incorrectly located)
Courtesy U. S. Electrical Motors, Inc.

FIGURE 9



PRESSURE FITTING WITH RELIEF PLUG
(correctly located)
Courtesy U. S. Electrical Motors, Inc.

The Institute Spokesman apologizes to Mr. R. L. Wheeler and *Spokesman* readers for the transposition of captions which occurred under Figures 8 and 9 on page 29 of the May 1952 issue. The same figures with corrected captions are shown above.

Mr. Wheeler's full title with Gulf Oil Corporation, which was omitted, is Chief Fuels and Lubricants Engineer, General Machinery Division.

PEOPLE in the Industry

J. S. Haskins Selected To Direct Public Relations At American Oil Co.

Appointment of James S. Haskins as director of public relations of the American Oil Company was announced recently by Herschel C. Smith, president of the company.

President Smith said that Mr. Haskins, former national field operations supervisor for the Oil Industry Information Committee, would take over the newly created position immediately. Mr. Haskins will direct the development of public relations for the company which markets petroleum products from Maine to Florida.

Mr. Haskins joins the American Oil Company after 21 years of professional public relations and newspaper experience in the Middle West and the East. He entered public relations work in New York in 1942 after 11 years of editorial experience with the Detroit Free Press, Detroit News and the Associated Press bureaus in Boston and Detroit.

In the public relations field, he was associated by Carl Byoir & Associates, Schenley Distillers Corporation, Fred Eldean Organization and the American Petroleum Institute.

L. S. McCaslin Promoted By Deep Rock Oil Corp.

Leigh S. McCaslin, Jr., has been named advertising and sales promotion manager of Deep Rock Oil Corp., it has been announced by W. J. Fuchs, merchandising manager.

The new department manager joined Deep Rock in July, 1951 as advertising assistant. Prior to that time he was associated with an oil industry trade paper for four years as district editor.

Mr. McCaslin is a graduate of Oklahome A. and M. College and has a bachelor of science and professional degrees from that institution. During World War II he served 44 months with the U. S. Corps of Engineers, including two years in the Pacific theater, and was a major upon discharge in 1946.

Emery Chemical Sales Meeting Sets Stage for Territory Changes

F. L. Ekstrand N. F. Reinert A. R. McDermott

Among the most important announcements released at the annual meeting of the chemical sales staff of Emery Industries, Inc., held at Cincinnati the week of April 7th, was the program of territorial expansion now underway to insure better service to users of Emery fatty acids, Twitchell products, and plasticizers.

A. R. McDermott, who comes from the Chicago district office, will assume the responsibility for all sales in Texas, Louisiana, Oklahoma and Arkansas. N. F. Reinert, formerly with the development and service department, is assigned to the Chicago office where he will work under D. R. Eagleson, who is in charge of that office.

A new addition to Emery's sales staff, F. L. Ekstrand, will be assigned to the Philadelphia office to cover eastern Pennsylvania and southern New Jersey, as well as parts of Philadelphia.

Mr. Ekstrand had been associated with the Borne Scrymser Company in a sales capacity since his graduation from Lowell Textile Institute in 1939. He is the president of the New York Alumni of Phi Psi and is an active member of the Association of American Textile Chemists and Colorists, American Association of Textile Technologists and the American Leather Chemists Association.

The general theme of the sales meeting was "Better Service to Fatty Acid Users". This was highlighted by an unusual panel discussion in which the individual salesmen exchanged information, ideas, and experiences pertaining to both successful and unsuccessful sales experiences and product applications. Unusual applications of Emery fatty acids, plasticizers, textile oils, and emulsifiers, were both enlightening and entertaining. Each discussion was supplemented with samples of the products involved.

Several new products were released from the Development and Service Department to become important new sales products. Full details concerning these will be released soon.

The meeting concluded with a golf tournament in which home-office executives competed unsuccessfully against sales personnel. Joe "Hogan" Clancy walked off with the honors.

Four Freedoms Named For Researchers

Four freedoms for researchers are given by C. A. Elvehjem, University of Wisconsin, in Chemical and Engineering News (April 14, 1952). They are: Freedom to think without interruption; freedom to experiment without limitation; freedom to use past recorded knowledge without too much difficulty; freedom to disseminate findings and discoveries as researcher sees fit.

Service Awards Presented By Nopco Chemical Company

In a recent ceremony at the home office of Nopco Chemical Company at Harrison, New Jersey, solid gold watches were awarded to thirteen employees who celebrate 25th Anniversaries with the company this year.

The group includes Mrs. Charlotte Williams, A. Victor Jay, Perc S. Brown, Nicholas Kazmiryk, James Bremner, Addison Wilson, Robert Jackson, William E. McGarry, John Goeller, Meyer Yablonsky, George H. Faux, Robert F. McClellan, Frank E. Knab.

At this same meeting, the Nopco 15-Year Club inducted 16 new members. These employees were presented with gold service emblems and will be entitled to three weeks annual vacation instead of the customary two weeks from now on. Included in the 15-Year group are: Cornelius Elphick, Ulmer Raper, Miss Phyllis Hammond, Ralph Rogers, Edwin Aymar, Paul Dressel, George Miller, Robert Thomas, George Conover, Thomas Phillips, Elmer Heydt, Michael Muzuroff, W. Miller, William Nothum, Harold A. Swanson, Thomas J. Campbell.

Presentation of awards was made by Charles P. Gulick, chairman of the board.

Service Awards Given To Gulf Marine Employees

Eighty-four employees of the Marine Department of the Gulf Oil Corporation were honored recently at the company's thirteenth annual service award meeting.

At a luncheon held in the Downtown Athletic Club, New York City, diamond and ruby lapel pins and engraved certificates were awarded to employees with periods of service ranging from ten to 35 years.

In announcing the plans for the presentation, Willard F. Jones, vice-president in charge of the Marine Department for Gulf, said: "A major factor in creating the success of the Gulf organization has been the loyalty, skill and cooperation of our veteran workers."

"These seasoned men," Mr. Jones continued, "have been the very heart of our employee group throughout Gulf's history. We are fortunate to have a

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- √ ***emulsifiers for agricultural and insecticide sprays***
- √ ***special emulsifying formulations***

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Sonneborn petroleum sulfonates—superior in quality and possessing exceptional uniformity—are now made to fit a wide variety of specific needs. They can also be tailor-made to your exact specifications. You can rely upon prompt shipment.

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Pa. 2-7400

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pool of such employees from which promotions and advancements to positions of greater responsibility can be made. They have contributed much to the leadership which has aided Gulf in becoming one of the great firms of the nation."

Altogether this year throughout the company, Gulf is honoring 3991 veteran employees for having completed their first ten years or a subsequent five-year period of service during 1951. A total of 17,639 active employees will then belong to this veteran's group—or 40 per cent of Gulf's total working force.

Managers, Chief Chemist Named at Sonneborn Plant

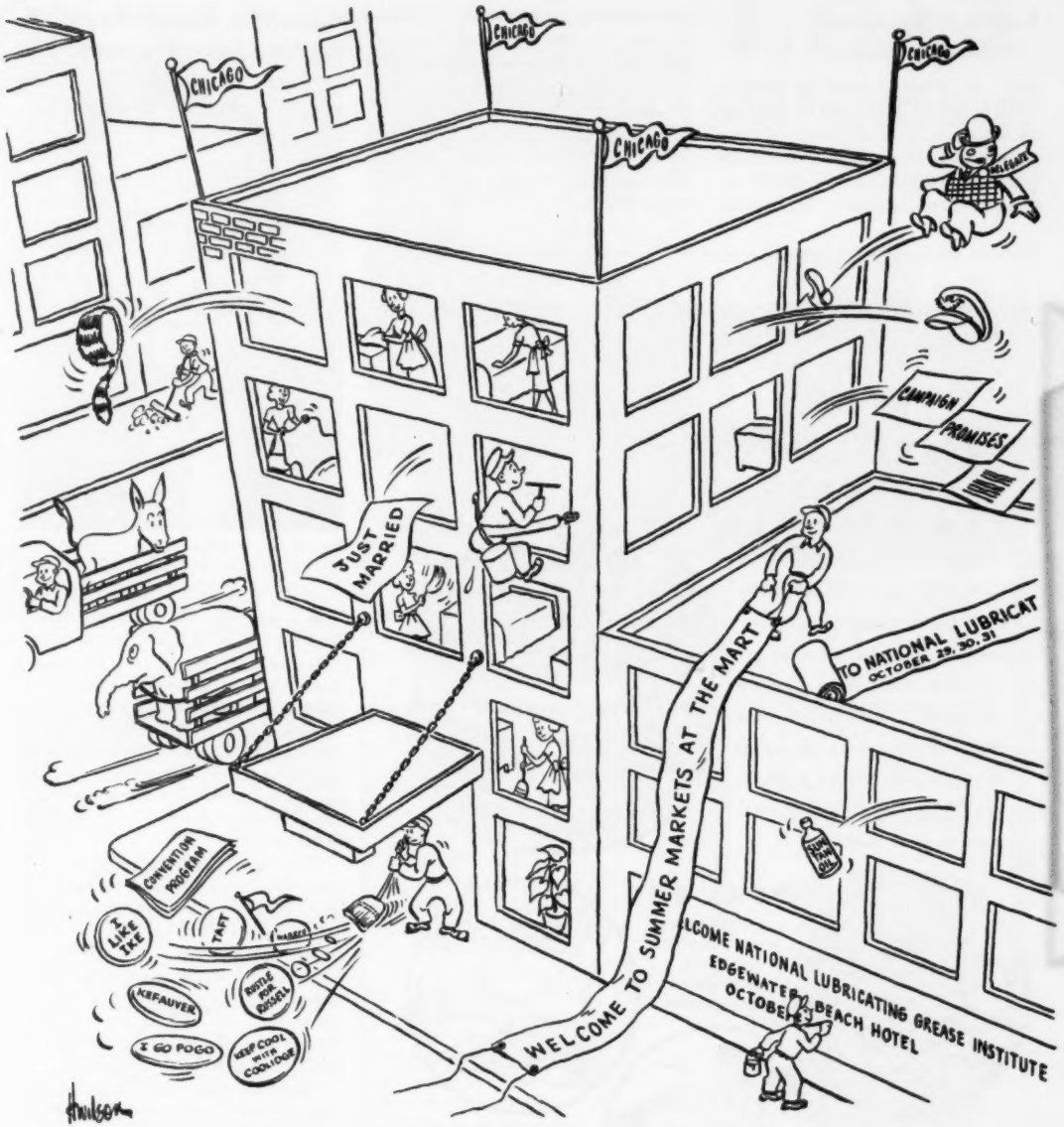
I. Silverman, former assistant manager of the Nutley, New Jersey, factory of L. Sonneborn Sons, Inc., New York, petroleum refiners and manufacturing chemists, has been appointed factory manager. Among others named to new posts are H. Riess, assistant factory manager, and A. Moscowitz, chief chemist. Announcement of the appointments followed the recent deaths of P. Dettelbach, former factory manager, and J. M. Kroth, former manufacturing supervisor.

Cordano Appointed By Morehouse Industries

The Cordano Chemical Company of Portland, Oregon, has been appointed to act as agents for Morehouse milling equipment, it is announced by George E. Missbach, sales manager for Morehouse Industries of Los Angeles.

Warren C. Cordano, owner of the firm bearing his name, which he formed in 1950, is a native of Portland and has been active in that area for the past 16 years, representing manufacturers of alkyds, resins, driers and other raw materials for the paint industry. His intensive and practical technical experience with local paint manufacturers prior to and during World War II should prove of particular value to paint makers in the Portland area in the sales and servicing of Morehouse equipment. Morehouse mills have been in widespread use for many years in the processing of all

(Continued on Page 34)



"The Hotels Will Be Ready For You — Will You Be Ready for Them With a Reservation for the NLGI Annual Meeting, October 27-29? It's at the Edgewater Beach Hotel, Chicago, This Year."

Cordano Appointed . . . .

(Continued from Page 32)

types of coatings including enamels. "Carborundum" stones, developed specially for and distributed only by Morehouse, plus the patented Morehouse grinding principle make it possible for users to show consistently high production records, ranging from 20 gallons per hour for the Model M laboratory mill to the high production Model B2000 which produces more than 500 gallons per hour.

Mr. Cordano will maintain his office and warehouse at 0618 S. W. Gibbs Street, Portland 1, Oregon.

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BECAUSE EVERYBODY CAN USE THEM

G. P. & F. Flexible Spout Utility Cans are so handy for so many uses—no wonder oil sales go up the moment these cans are displayed! These sturdy, steel shipping containers do more than just deliver your product. They'll give a real promotional push to your sales.

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Furnished in solid colors or lithographed with your own design, trademark or advertising message. Write for complete details and prices.

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GEUDER, PAESCHKE & FREY CO.

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Battenfeld Names Postell As West Coast Representative

J. C. Postell

Mr. J. C. Postell is Battenfeld's new West Coast representative. Since April 1 he has handled all California accounts.

For 20 years prior to 1943 Mr. Postell was with the Standard Oil Company of Kentucky. The last ten years of this time he was in charge of the lubricating oil sales department. Upon resigning from Standard Oil in 1943 he became vice-president of the Continental Refining Products Company of Oil City, Pennsylvania.

After serving in this capacity for five years Mr. Postell formed the State Oil and Grease Company and marketed his own brands in the southeastern United States.

Mr. Postell was at one time associated with the late Amelia Earhart. He assisted her in making an itinerary through the southeast for one of her advertising sponsors.

The new West Coast representative and his wife live at 624 Lincoln Boulevard in Santa Monica, California.

Ways to provide a proper climate for research, according to W. F. Rockwell, Jr., president, Rockwell Manufacturing Co., are (1) furnish good direction, (2) offer adequate compensation, (3) supply adequate facilities and good working conditions, (4) have patience, and (5) give the research director a reasonably free hand.

Emery Industries, Inc., Establishes Research Fellowship

C. G. Goebel

J. D. Fitzpatrick

With the establishment of a Research Fellowship in the Graduate School of Applied Science of the University of Cincinnati, Emery Industries, Inc., of Cincinnati, Ohio, revealed its program for an even more intensive study of the chemistry of fats and oils, and related products.

J. D. Fitzpatrick, who joined Emery in 1935 immediately after receiving his degree in Chemical Engineering from the University of Cincinnati, will become the first fellow under this grant.

In his new position, Mr. Fitzpatrick will continue on a broader scale, work he has carried on since 1943 when he became the first manager of Emery's new chemical research department. Dr. Charles G. Goebel who has been associated with Emery Industries since 1943, will succeed Mr. Fitzpatrick as the head of this department.

Dr. Goebel obtained his A.B. degree in Chemistry from the University of Indiana and his Ph.D., organic chemistry major, from Purdue.

The work of both of these men has been quite revolutionary in its scope. Mr. Fitzpatrick developed the first practical method for the chromic acid oxidation of oleic acid to produce azelaic and pelargonic acids. Dr. Goebel's research has resulted in a new plant to manufacture a dimerized fatty acid, dilinoleic acid. Marketed as Emery 955 Dimer Acid, it has enjoyed considerable success in the fields of adhesives and surface coatings.

Their most recent activity concerned the development of an ozone oxidation process for producing azelaic and pelargonic acids from oleic acid. Construction of a new two-million-dollar plant for this unique process is now in progress.

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FOR OILS, GREASES, ETC.

No. 9 Niles Pail with lug cover and pour spout.

NILES STEEL PAILS

ordinarily are supplied with bail handles. Fabricated from black steel—outside painted or lithographed to order. Removable tops with lug covers, with or without pour spouts. Also in tight head style. 3½ to 6 gallon capacities.

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55, 30 and 15 gallon capacities; and 100 lb. grease drums. Full open head or Bung type. Painted or fully decorated. Interior lacquered if desired.

100-lb. Niles Grease Drum with 14 inch full open top lug cover. Also made with 9 inch lug cover in center of head.

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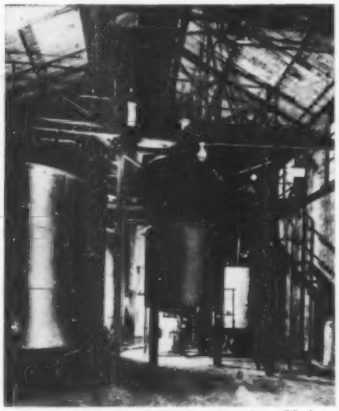
Industry NEWS

W. C. Hardesty Co. Builds Hydrogenation Unit At New Toronto, Ontario

The first plant in Canada for the production of hydrogenated fatty acids and glycerides in the inedible field has just been completed at New Toronto, Ont.—a $100,000 enterprise by W. C. Hardesty Co.



Overall View of Hydrogenation Unit

The new hydrogenation equipment includes all the latest improvements, developed through years of experience in operating similar units at W. C. Hardesty Co.'s Dover, Ohio, plant. It is designed to be operated completely by one man. The progress of the entire reaction is automatically recorded on a centrally located control panel from which all process variables may be controlled.

Many new products are possible with this equipment. A long range program of development has already been initiated by W. C. Hardesty Co. For example, it is expected that 12-hydroxy stearic acid, now used only in experimental batches because of its high price, may be produced economically in this type of unit. Also materials such as partially hydrogenated fats and fatty acids for specialized industrial uses are being considered.

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from a

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Buffalo, N. Y.

Manufacturers of Lubricants

That will bear

"YOUR" BRAND NAME

With

DISTINCTION

Alox Develops Replacement For Blown Rape Seed Oil

A replacement for blown rape seed oil has been announced by the Alox Corporation, 3901 Buffalo Avenue, Niagara Falls, New York.

This new product is used as an additive to marine engine oils to promote water in oil emulsions.

The product is a synthetic, resulting from several years work and evaluations. It is readily available from the Alox plant in Niagara Falls. Five per cent Alox 1657 is claimed to be equivalent to ten per cent blown rape seed oil in marine engine oil formulations.

New Division Organized By Witco Chemical Company

Witco Chemical Company has organized an Oil Black Division which includes the Continental Carbon Company plant in Sunray, Texas, and the Continental Oil Black plant in Westlake, Louisiana.

J. H. Wishnick and R. A. Reinke have been appointed manager and general superintendent respectively of the new division.

Midwest Research Installs Pipeline-Network Analyzer

A pipeline-network analyzer, used in solution of problems involving pipeline flows and pressure losses in pipeline networks, has been installed by Midwest Research Institute. The McIlroy Pipeline-Network Analyzer is one of three such devices in the United States. The others are located at Washington State College and Cornell University, where the first one was installed in 1949.

This seven-foot electronic and mechanical marvel has proven itself extremely valuable and a great time-saver, when several alternate plans are under consideration for construction, extension or reinforcement of a pipeline network, by cutting down the time used in calculations. Once the analyzer is set up for a specific problem, the answers can be obtained in about half an hour, where formerly it took days and weeks by trial and error methods.

Typical examples of the varied applications of the analyzer are found in studies such as determination of favorable location for pipelines; selection of pipe diameters for best combination of economy and performance; effects of choice of elevation of reservoirs or storage tanks; and evaluation of pressure variations.

The analyzer utilizes a system of electrical analogies for physical factors involved in networks carrying water, oil and natural gas, as well as steam heating networks and air conditioning systems. An electrical control board is used to duplicate an actual supply network, which can be composed of as many as 99 different supply lines. The operator can also control such factors as source, rate of flow, pressure and other related elements.

Special tubes, known as fluistors, are employed and the amount of light reflected by these lamps indicates the section of pipeline which is under the heaviest load, and the meter readings on the front of the device register other comparative values of pipeline networks. Engineers are thus able to evaluate and interpret the results to determine construction or modification requirements.

Emery Describes New Vegetable Oleic Acid In Booklet Now Available

A technical bulletin describing the new, unique vegetable oleic acid, Emersol 240 Vegetable Elaine, is available on request.

This booklet contains a discussion of its main features: (1) all vegetable origin; (2) excellent oxidation stability; (3) unusually bland odor, as well as specifications, composition, and applications. Also included are charts illustrating its oxidation stability as compared to other Emery oleic acids and ordinary grades, and the solubility of both potash and soda soaps.

For a copy of this bulletin titled "Emerson 240 Vegetable Elaine", write to:

Emery Industries, Inc.
Dept. 5, Carew Tower
Cincinnati 2, Ohio

Lane-Wells Sponsors Student Contest

The Lane-Wells Company is sponsoring a Technical Paper Contest for Petroleum Engineering students of ten universities and colleges throughout the United States and Canada.

Lane-Wells, in celebrating its 20th year of service to the petroleum industry, is presenting this event for the benefit of the industry and the petroleum engineering students who will some day be a part of it.

Those eligible are undergraduate or graduate students in petroleum engineering who are regularly enrolled at Agricultural and Mechanical College of Texas, Colorado School of Mines, Louisiana State University, Pennsylvania State College, Tulsa University, University of Alberta (Canada), University of California, University of Oklahoma, University of Southern California, or University of Texas.

A $200 First Prize and $100 Second Prize will go to the authors of the best papers presented at each school. The winning papers of each school will be collected, bound and distributed to the petroleum industry and participating universities.

The contest is open now. Complete details can be obtained from the head of the department of petroleum engineering at each of the schools listed above.

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● Sperm Oil is one of nature's best anti-rust materials. Possessing an unusually high film strength, it coats metal surfaces evenly and thoroughly. Furthermore, Sperm Oil tends to penetrate into the pores of metals, giving better protection and a longer protective life. Heat-treated parts that have been quenched in Sperm Oil, for example, can be stored for months without showing signs of rust. Stampings that have been Sperm Oil dipped or sprayed can also be stored for long periods.

Since Sperm Oil has a negligible free fatty acid content, it does not oxidize, harden, or form metallic soaps. As a result, "cementing" of stacked sheet or plate can be prevented by Sperm Oil coating.

If the oil you make is used for slushing, cutting, grinding, quenching, parting, penetrating or lubricating it will pay to investigate the high rust-inhibiting properties of Sperm Oil.

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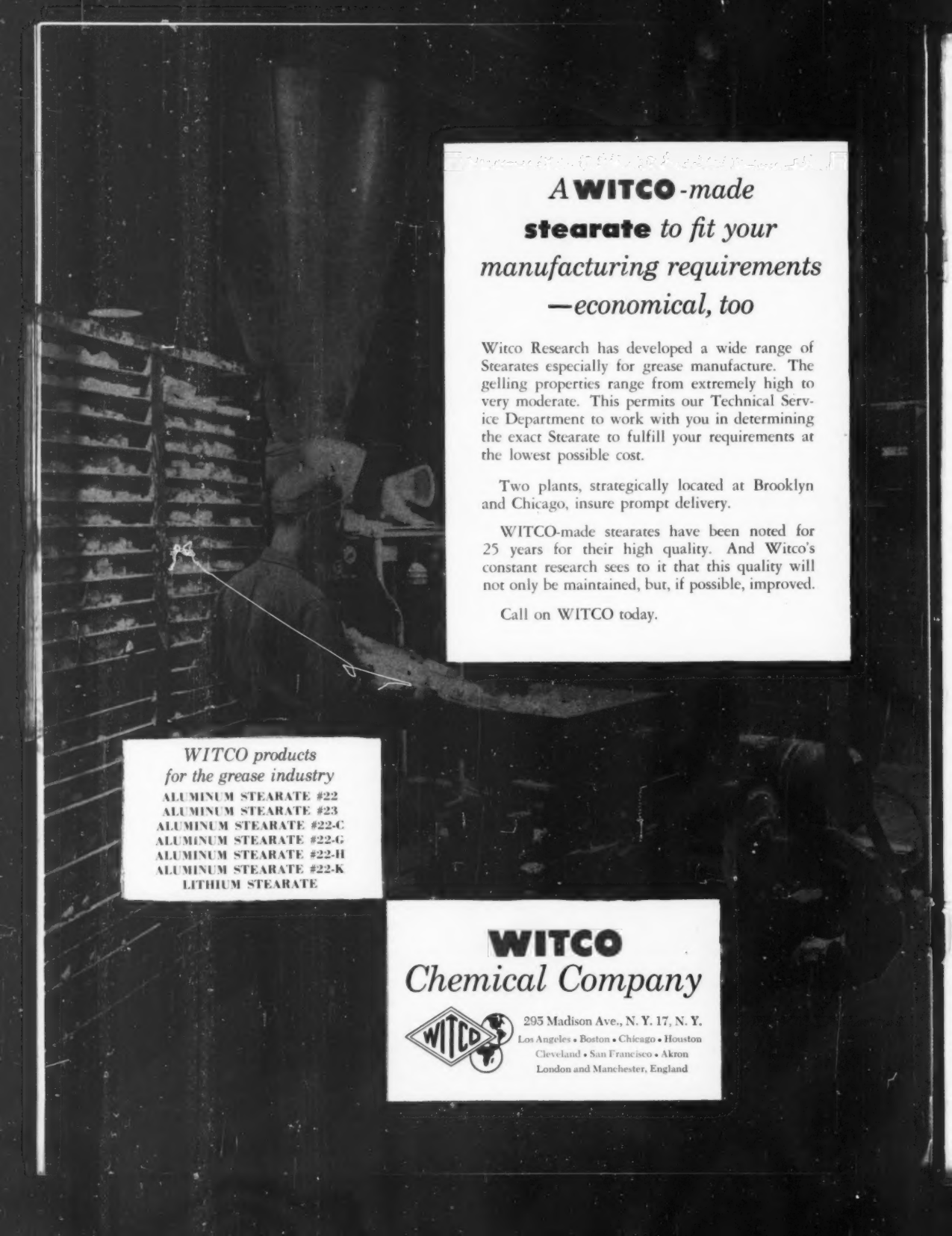

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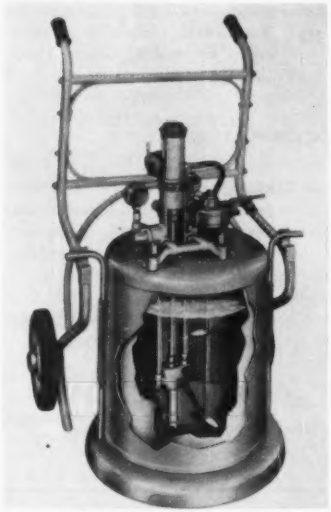
Gray Company Announces New Portable Spray Gun For Maintenance Divisions

A new Portable Heavy-Duty Paintmaster spray gun supply pump that works directly from 5-or 10-gallon original containers has been announced by the Gray Company, Inc.



Portable Spray Gun

The air-operated, double-action, reciprocating pump is designed for easier handling of paints and materials by plant maintenance departments. The new supply pump can be used as a portable sprayer with the Sta-Level hand truck. One man easily handles the Paintmaster. Large rubber-tired wheels roll over rough areas smoothly—or for stationary operation, the truck simply disengages from the trunnion arms—no bolts or pins to remove or lose.

The separate air-operated, dual-bladed agitator keeps the materials well mixed—independent of paint pump operation. The blades, of non-sparking aluminum, are adjustable to any depth. Since no air pressure is exerted on the material, aeration is reduced to a minimum.

Production departments will also find wide use for the new unit in handling many finishing jobs where a fast setup is needed. The unique design and construction of the pump economically handle many abrasive-type materials, and it is good for spraying most of the newer vinyl and plastic base coatings. A 10-gallon liner container is provided for special mixing conditions.

General contracting work—indoors or outside—can use the 10-gallon Paintmaster to advantage. The powerful pump is ideal for long lines or multiple spray guns even in colder temperatures where its efficient agitation brings heavy, viscous materials to proper consistency.

For additional information about the Graco Portable Heavy-Duty Paintmaster, write the Gray Company, Inc., 1012 Sibley Street, Minneapolis 13, Minnesota.

API Adopts New System Of Service Classifications

The new system of service classifications and designations for automotive lubricating oils was announced recently by the Lubrication Committee of the American Petroleum Institute.

The new nomenclature was approved by the API board of directors at a meeting in Tulsa. It had been approved previously by the API's Marketing Division, by the American Society for Testing Materials, and the automotive industry.

The Lubrication Committee had planned to withhold details of the new classifications until it had a chance to set up some educational material, but decided to announce them immediately in view of many requests from the oil and automotive industries.

The new classifications were devised after it became apparent that advances in additive-treated motor oils had made existing crankcase oil terminology inadequate and obsolete.

The new classifications are as follows:

Service MS

Service typical of gasoline or other spark ignition engines operating under unfavorable or severe types of service conditions and where there are special lubrication requirements for deposit or bearing corrosion control, due to operating conditions or to fuel or to engine design characteristics.

Service MM

Service typical of gasoline and other spark ignition engines operating under moderate to severe service conditions, but presenting problems of deposit or bearing corrosion control when crankcase oil temperatures are high.

Service ML

Service typical of gasoline and other spark ignition engines operating under light and favorable service conditions, the engines having no special lubrication requirements and having no design characteristics sensitive to deposit formation.

Service DG

Service typical of diesel engines in any operation where there are no exceptionally severe requirements for wear or deposit control due to fuel or to engine design characteristics.

Service DS

Service typical of diesel engines operating under extremely severe conditions or having design characteristics or using fuel tending to produce abnormal wear or deposits.

Groundwork for the new system of classifications was laid by a special Lubrication Committee panel headed by George Round, of Socony-Vacuum Oil Co., New York. The nomenclature now makes it possible for consumers to choose crankcase oils with a common denominator of engine design and application.

The API Lubrication Committee, at its meeting in Tulsa, on May 27 and 28, gave further consideration to the new classifications, and will begin preparation of educational and informational materials to help establish them for the oil and automotive industries, and the public.

Chek-Chart Announces 1952 Lubrication Guide

Chek-Chart's 1952 Automotive Lubrication Guide is ready to go to work. This year's 130-page lubrication service guide has just come off the press and is now available for delivery, according to The Chek-Chart Corporation, Chicago.

Up-to-date lubrication recommendations for every make and model passenger car from 1941 through 1952 are included in this valuable reference. Charts of some of the more popular 1939 and 1940 cars are included to provide coverage of over 80 per cent of cars now on the road.

Individual charts of each car, with accompanying lubrication recommendations, have been processed by Chek-Chart's staff of lubrication engineers and each chart carries the approval of the manufacturer.

FUTURE MEETINGS of The Industry

JUNE, 1952

19-20 American Management Assn. (general management), Waldorf-Astoria, New York, N. Y.

19-20 Kentucky Oil & Gas Assn., The Phoenix Hotel, Hotel Lafayette, Lexington, Ky.

22-25 Petroleum Equipment Suppliers Assn. (annual meeting), Mark Hopkins Hotel, San Francisco, Calif.

22-27 American Socy. for Testing Materials (Com. D-2 on Petroleum Products and Lubricants), New York, N. Y.

23-27 American Socy. for Testing Materials (annual meeting), Hotel Statler, New York, N. Y.

23-27 American Inst. of Electrical Engineers (summer general meeting), Nicollet Hotel, Minneapolis, Minn.

AUGUST, 1952

11-13 Socy. of Automotive Engineers (national West Coast meeting), Fairmont Hotel, San Francisco, Calif.

19-22 American Inst. of Electrical Engineers (Pacific general meeting), Westward Ho, Phoenix, Ariz.

SEPTEMBER, 1952

8-12 Instrument Society of America (7th nat'l instrument conference & exhibit), Cleveland Auditorium, Cleveland, Ohio.

9-11 Oil Industry Information Committee, The Traymore, Atlantic City, N. J.

9-11 Socy. of Automotive Engineers (national tractor meeting), Hotel Schroeder, Milwaukee, Wisc.

10 American Petroleum Institute (Division of Marketing, Lubrication Committee), The Traymore, Atlantic City, N. J.

10-12 National Petroleum Assn. (50th annual meeting), The Traymore, Atlantic City, N. J.

SEPTEMBER, 1952

14-19 American Chemical Society (122nd nat'l meeting) (Petroleum Division), The Traymore, Atlantic City, N. J.

22-24 American Trade Assn. Executives (annual meeting), Royal York Hotel, Toronto, Ontario

23-24 American Petroleum Institute (Executive Committee of the Board of Directors), Greenbrier, White Sulphur Springs, W. Va.

25-27 Independent Oil Compounders Association (5th annual meeting), Edgewater Beach Hotel, Chicago, Ill.

OCTOBER, 1952

1-4 (tentative) Socy. of Automotive Engineers (national aeronautic meeting and aircraft engineering display), New Hotel Statler, Los Angeles, Calif.

5-8 Controllers Inst. of America, Hotel Statler, Detroit, Mich.

6-8 National Assn. of Oil Equipment Jobbers (2nd annual meeting), The Neil House, Columbus, Ohio.

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FUTURE MEETINGS of Your Industry

OCTOBER, 1952

12-18 Oil Progress Week.

13-15 Texas Mid-Continent Oil & Gas Assn. (33rd annual meeting), Hotel Texas, Fort Worth, Texas

20-22 American Oil Chemists' Socy. (fall meeting), Netherlands Plaza Hotel, Cincinnati, Ohio.

20-24 National Safety Council (40th national safety congress and exposition), Conrad Hilton Hotel, Chicago, Ill.

22-24 Socy. of Automotive Engineers (national transportation meeting), Hotel William Penn, Pittsburgh, Pa.

27-29 National Lubricating Grease Institute (20th annual meeting), Edgewater Beach Hotel, Chicago, Ill.

29 Oil Trades Assn. of New York, Inc., Waldorf-Astoria, New York, N. Y.

NOVEMBER, 1952

3-4 Socy. of Automotive Engineers (national diesel engine meeting), Chase Hotel (tentative), St. Louis, Mo.

6-7 Socy. of Automotive Engineers (national fuels and lubricants meeting), Mayo Hotel, Tulsa, Okla.

8-13 Oil Industry Information Committee, Conrad Hilton Hotel, Chicago, Ill.

11-12 American Petroleum Institute (Board of Directors meeting), Conrad Hilton Hotel, Chicago, Ill.

13 American Petroleum Institute (Executive Committee meeting), Conrad Hilton Hotel, Chicago, Ill.

19 American Standards Association (34th annual meeting), Waldorf-Astoria, New York, N. Y.

30 to Dec. 5 American Socy. of Mechanical Engineers, Statler Hotel, New York, N. Y.

DECEMBER, 1952

1-6 20th National Exposition of Power & Mechanical Engineering, Grand Central Palace, New York, N. Y.

7-10 American Inst. of Chemical Engineers (annual meeting), Hotels Cleveland and Carter, Cleveland, Ohio.

MARCH, 1953

2-6 American Socy. for Testing Materials (spring meeting), Hotel Statler, Detroit, Mich.

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